

REMARKS

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The present filing is responsive to the Office Action.

Summary of the Response

Claims 6-8 have been amended. New claims 10-20 have been added. Claims 1-20 remain pending in this application. Reexamination and reconsideration of the present application as amended are respectfully requested.

Claim Rejections Under 35 USC 103

Claims 1-4, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US 5,949,507) in view of Yang et al. (US 2003/0086036). Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. and Yang in view of Maeda et al. (US 7,176,994). Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. and Yang. These rejections are respectfully traversed.

The Examiner conceded that Shimada does not disclose using a photo-embossing material. This is not the only deficiency of Shimada. Shimada also does not disclose first exposing an insulating layer by reducing a thickness of an organic material film, and then dry etching the exposed insulating layer to form a contact hole, as required by independent claim 1.

Referring to the embodiment disclosed in Figs. 1-4 of the present application, the organic material film 20 is disposed on the insulating film 18. The insulating film 18 is exposed in a contact-hole-forming-area X by reducing a thickness of the organic material film 20a by a dry etching. Then, a contact hole 22 is formed by dry etching to the exposed insulating film 18. As

disclosed in paragraph [0033] of the claimed invention, the organic material film 20a having projections and depressions is formed by an exposure step and a baking step. Therefore, the entire process, from forming the projections and depressions to the forming the contact hole, can be done without the necessity for any wet processes.

The deficiencies in Shimada are clear from a reasonable reading of the reference. Referring to Figs. 3A-3F and col. 14, line 63 to col. 15, line 60 in Shimada, the organic insulating film 15 is disposed on the organic insulating layer 12, and the contact hole 43 is formed by exposure and development of the combined structure of the organic insulating layer 12 and the organic insulating film 15. Nowhere in Shimada is there any teaching or suggestion of reducing a thickness of the organic material film 15 in a contact-hole-forming-area by dry etching to expose the underlying insulating film 12, and then dry etching the exposed insulating film 12. Shimada also never teaches or suggests dry etching the insulating film 12 to form a contact hole. Further, as disclosed in Shimada, it needs a developing step to form the contact hole 43. Therefore, Shimada involves wet processes in connection with forming the relevant layers.

Yang does not make up for the deficiencies of Shimada. Referring to Figs. 4B-4C and paragraphs [0066]-[0070] in Yang, the contact hole 215 is formed by a UV exposure process and a development process. The Examiner alleged that Yang discloses a photo-embossing material patterned by an exposing step and baking step. However, as disclosed in paragraph [0039] of Yang, the soft-bake process is performed to evaporate solvent in the photosensitive organic insulating layer and not in connection with patterning the photosensitive organic insulating layer. Instead, the photosensitive organic insulating layer of Yang is patterned by an exposure process and a development process. Nowhere in Yang is there any teaching or suggestion of reducing a

thickness of an organic material film in a contact-hole-forming-area by a dry etching to expose an insulating film under the organic material film. Yang also never teaches or suggests dry etching the insulating film to form a contact hole. As disclosed in Yang, it needs a development process to form the contact hole 215. Therefore, Yang specifically involves wet processes.

Accordingly, given the failure of Shimada and Yang, whether taken alone or in combination, to disclose the recited limitation of "exposing said insulating film in a contact-hole-forming-area by reducing a thickness of said organic material film by a dry etching to said organic material film and forming a contact hole by a dry etching to the exposed insulating film" of claim 1, even if Shimada and Yang can somehow be combined in the manner suggested only by the Examiner, such combination does not obtain the present invention.

Further, there is no teaching, suggestion, motivation or any apparent reason to make the combination in the first place. There is no apparent reason to modify the patterning process of the Shimada with a different process involving a photo-embossing material, which would require significant redesign of the entire fabrication process for the Shimada structure.

Given the patentability of independent claim 1, all claims dependent therefrom are likewise patentable over Shimada and Yang. Concerning claim 5, Maeda does not make up for the above noted deficiencies of Shimada and Yang. Concerning claims 7 and 8, these claims are patentable for at least the reasons given above.

New Claims

New claims 10-20 have been added to round out the coverage of the present invention.

Dependent claim 10 recites the projections and depressions of the organic material film are formed by subjecting the photo-embossing material to a mask and exposure to light, wherein

the projections and depressions in the organic material film include a thinnest region corresponding to the contact-hole-forming-area. Claim 11 further recites the mask comprises a light shield portions corresponding to the projections, semi-transparent regions corresponding to the depressions, and a transparent portion corresponding to the thinnest region in the organic material film. Claim 12 recites the insulating film is exposed by dry etching the thinnest region of the organic material film. These steps are not found in any of the cited references.

New independent claim 13 recites forming projections and depressions in the organic material film, including a thinnest region corresponding to a contact-hole-forming-area, dry etching the thinnest region of the organic material film to expose a region of the insulating film; and dry etching the exposed region of the insulating film to form a contact hole. The recited process is not disclosed by the cited references, for at least similar reasons discussed above.

The new dependent claims 14-20 add further limitations that further distinguish from the cited references. For example, claim 14 recites the organic material film comprises a photo-embossing material, wherein the projections and depressions are formed by subjecting the photo-embossing material to a mask and exposure to light; and claim 15 recites the mask comprises a light shield portions corresponding to the projections, semi-transparent regions corresponding to the depressions, and a transparent portion corresponding to the thinnest region in the organic material film. None of the references teach or suggest the recited processes.

CONCLUSION

In view of all the foregoing, Applicant submits that the claims pending in this application are patentable over the references of record and are in condition for allowance. Such action at an early date is earnestly solicited. **The Examiner is invited to call the undersigned**

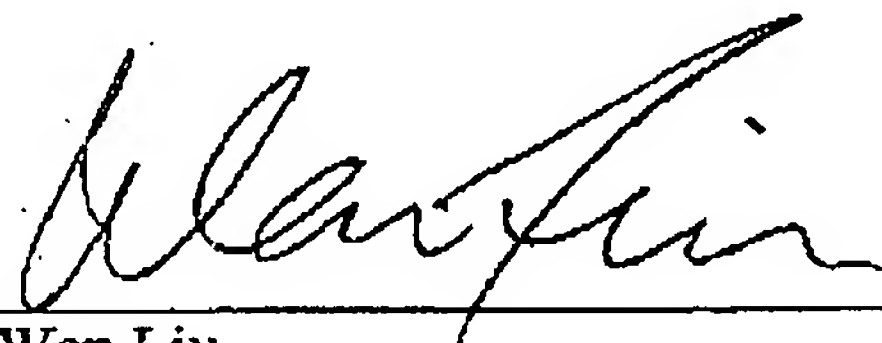
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representative to discuss any outstanding issues that may not have been adequately addressed in this response.

The Assistant Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this transmittal and associated documents, or to credit any overpayment to Deposit Account No. 501288 referencing the attorney docket number of this application.

Respectfully submitted,



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